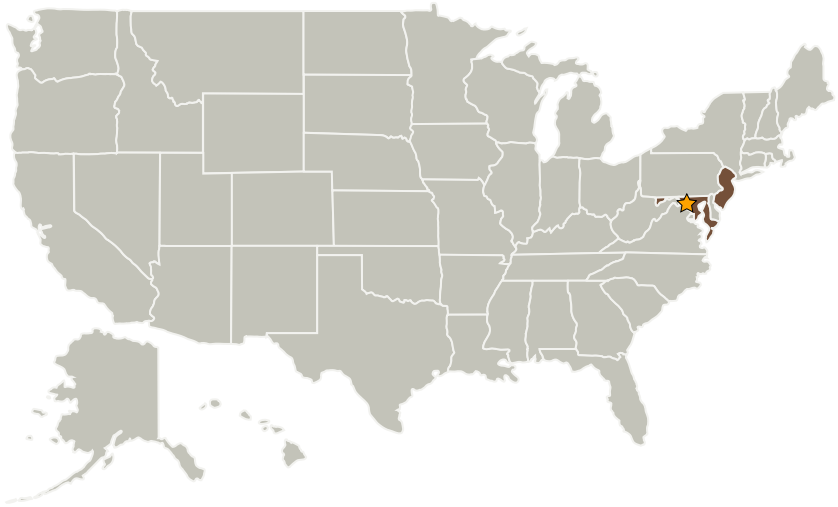
Variable Emissivity Electrochromics Using Ionic Electrolytes and Low Solar Absorptance Coatings, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

In recent work, this firm developed a highly promising, patented variable emittance technology based on electrochromic Conducting Polymers, with: (1) Thin (< 0.2 mm), flexible, lightweight (0.176 kg/m2), variable area (0.5 cm2 - 0.5 m2. (2) Impervious to flexing, micrometeoroids.(3) High Delta Emittance (0.5, range 0.13 - 0.89).(4) > 105 cycles, < 5 s switching, indefinite optical memory. (5) Low power, 0.30 W/m2 (6) Space durability: (10-6 Torr) 100,000 electrochromic cycles, 90 thermal cycles;. no UV degradation > 500 h. Durability against atomic-O. (7) Operating temperature (-) 45 oC to (+) 100 oC, durability (-) 196 oC to (+) 100 oC. (8) Easily applicable with space-qualified adhesive to any surface. (9) Cost ca. < $5K/m2. A key technical barrier of the earlier generation of this technology was the need for a hermetic seal for space durability. This was resolved through use of unique ionic electrolytes. An additional drawback remained: High solar absorptance of the dark-state. In very recent, unrelated work, this firm has developed coatings that are IR transparent from 2 to 25 microns while having very low solar absorptance (data herein). In the proposed work, these will be used to arrive at unique, variable emissivity materials with very low solar absorptance. Proposed work includes extensive space durability testing.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Ashwin-Ushas Corp, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Holmdel, New Jersey

Primary U.S. Work Locations	
Maryland	New Jersey

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Prasanna Chandrasekhar

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic